


DIGICATORTM



ACTUAL
SIZE
SERIES 10

**Series 10 & 11
ELECTRONIC
NUMERIC
READOUTS**

microphysics  inc.

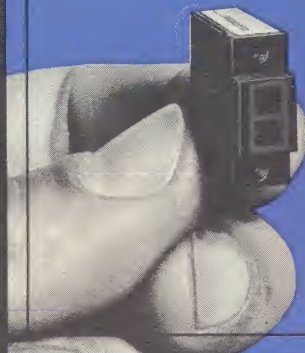
Series 10
and
Series 11

DiGiCATOR

Electronic
Numeric
Readouts

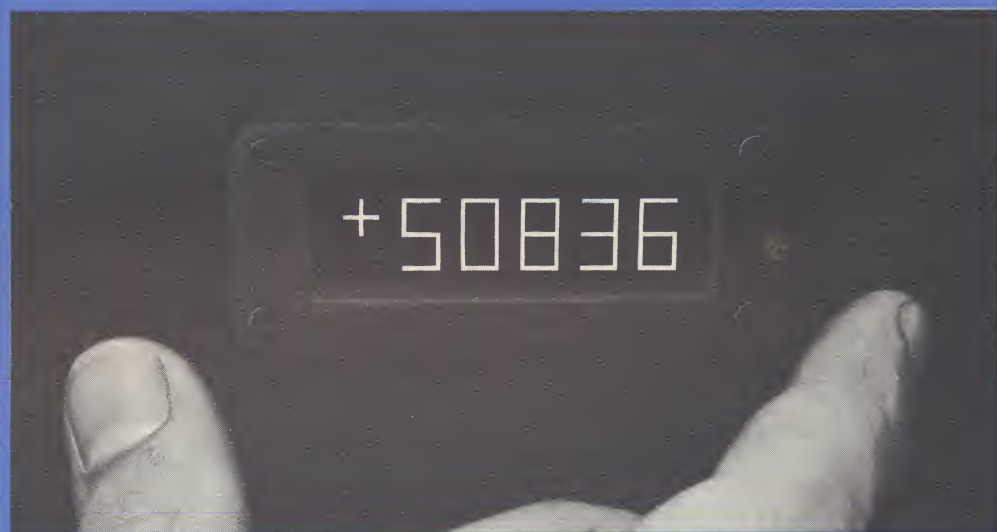
This is DiGiCATOR

The new MICROPHYSICS line of electro-optical incandescent readouts with a host of exclusive design and performance characteristics that make them ideal for a wide range of numerical display applications, including:



Digital Voltmeters, Ohmmeters
Frequency Meters, Counters
Electronic Digital Clocks
Digital Calculators
Computer Readouts
Remote-Repeater Indicators
Stock Quotation Boards
Command & Control Presentations

Production Control Boards
Process Control Panels
Transportation Schedule Boards
Signal Indicators
Airborne Instruments
Marine Instruments
Missile Command Panels
Test & Checkout Systems



SAVE SPACE

A typical 6-digit panel installation of Series 10 DIGICATOR readouts requires only 1½ inches of width!

SAVE WEIGHT

Total weight of six Series 10 DIGICATOR readouts is only 1 ounce!

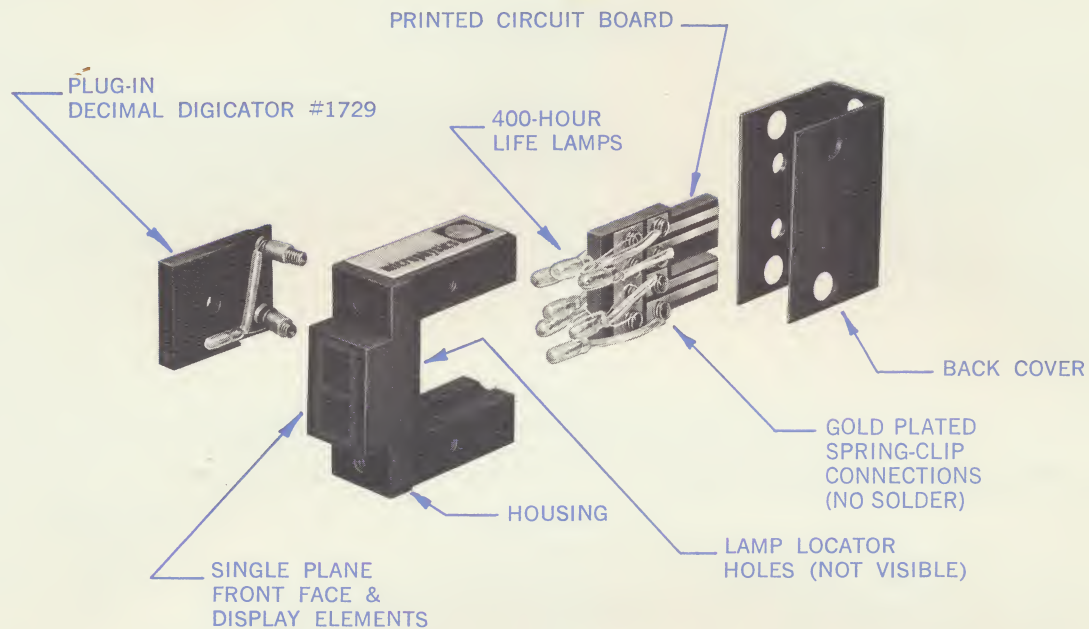
SAVE POWER

Total power required for six Series 10 DIGICATOR readouts is only 1½ watts! They may be driven **directly** by readily available, commercial transistor circuits without high-cost buffers.

STANDARD NUMERICAL PRESENTATION	Each Numeric DIGICATOR provides display of numerals "0" through "9". In addition, two other units are also available: a "side-saddle" decimal point unit which may be mounted to the side of a Numeric DIGICATOR without any additional wiring or connectors, and a Plus-Minus DIGICATOR. Other display symbols or presentations, including alpha-numeric readouts, are available on special order.
NO MOVING PARTS SHOCK & VIBRATION RESISTANT	Rugged, simple design. Seven display elements are embedded in the DIGICATOR head — these elements are lighted as required to form the desired digital display. Lamps are positively located and secured within the DIGICATOR housing. Printed circuit boards are used for internal connections. Mounting to panels is quick and simple — ordinary screws are used. The compact construction and high resonant frequency characteristics of their mechanical design make these DIGICATOR units inherently resistant to shock and vibration. Their light weight is an important factor in preventing resonance conditions on flat panels.
HIGHEST BRIGHTNESS & READABILITY DIMMING CONTROL	Long-life, high-reliability incandescent lamps are employed as light source to provide a white, bright, sharp display — clearly visible under all normal ambient lighting conditions, without the need for auxiliary shades or shadow boxes. The Series 10 numeral display, $\frac{5}{32}$ " wide by $\frac{5}{16}$ " high, can easily be read from distances up to 15 feet. The larger Series 11 display, $\frac{5}{16}$ " wide by $\frac{1}{2}$ " high, can be read from distances up to 25 feet. In each, the numeral is clearly displayed, without any apparent separation or spaces between the lighted elements. Unlike neon, glow-tube, and other type units, DIGICATOR readouts can be directly dimmed as desired by simply varying the lamp voltage.
IMPROVED SHARPNESS & CONTRAST COLOR SCREENS	The display presented by each DIGICATOR unit is at least an order of magnitude sharper than neon, glow-tube, or projection type indicators. Contrast is emphasized and glare is minimized by a neutral-color, reflection-suppressing polaroid screen. The separate, one-piece screen — sized to fit the number of DIGICATORS in the installation — is held in place by a front bezel. Other color screens are available for special purposes.
FLAT, SINGLE-PLANE VIEWING	The seven light elements that form the display are all located in the same plane, on the front face of the DIGICATOR. There are no projection lenses or stacked plates, thus insuring unlimited viewing angle and sharp focus over the entire display area while eliminating problems of parallax and depth distortion. In a typical panel mounting, the front display face of the DIGICATOR unit is in the same plane as the front of the panel, further improving readability and simplifying panel design.
HIGH RELIABILITY REDUCED WIRING QUICK, POSITIVE TESTING	Service reliability is enhanced by the presence of only 7 elements in each unit, compared to at least 10 required in most other types of numeric readouts. This simple circuit also results in up to 30% less wiring required between the DIGICATOR and input control logic circuits. Quick testing of the DIGICATOR display is accomplished by simply energizing the numeral "8". This automatically checks all seven lamps and light elements at the same time.
NO CORONA PROBLEMS NO HUMIDITY PROBLEMS	In airborne applications, DIGICATOR readouts are recommended for high altitude operation. Low voltage levels eliminate the possibility of corona problems. The low impedance circuit, with electrical leakage not a critical factor, makes these units insensitive to humidity problems.
CHOICE OF MOUNTING STYLES EASY ACCESS	For both Series 10 and 11, four different mounting arrangements are available. 1. Rear access mounting, with screw-in bezel 2. Front access mounting, with multiple unit tie-bar 3. Plug-in mounting, for removable front panels 4. Plug-in front mounting, with snap-in bezel In each method, the required panel cut-outs are of a minimum number and extremely simple to prepare. The modular arrangement of separate DIGICATOR units to form a complete assembly permits quick access for replacement of any one unit.
FIELD-REPLACEABLE LAMPS	Unlike other types of numeric readouts, it is not necessary to discard the entire unit should any one lamp burn out. DIGICATOR units may be easily disassembled for field or shop replacement of any individual lamp without soldering or special tools.
HIGH SWITCHING SPEED	For those applications where it is desired to obtain permanent records such as movie filming of fast-changing display data, the high switching speed of DIGICATOR readouts is a distinct advantage; 10 milliseconds for the Series 10 and 20 milliseconds for the Series 11. Here, too, the brightness and sharp contrast of the DIGICATOR readout is an important feature.
DIODE MATRIX MODULES	Mating diode matrix modules are available from MICROPHYSICS for each DIGICATOR unit. (For customer-supplied circuits, complete data including schematics and technical recommendations is available on request.)

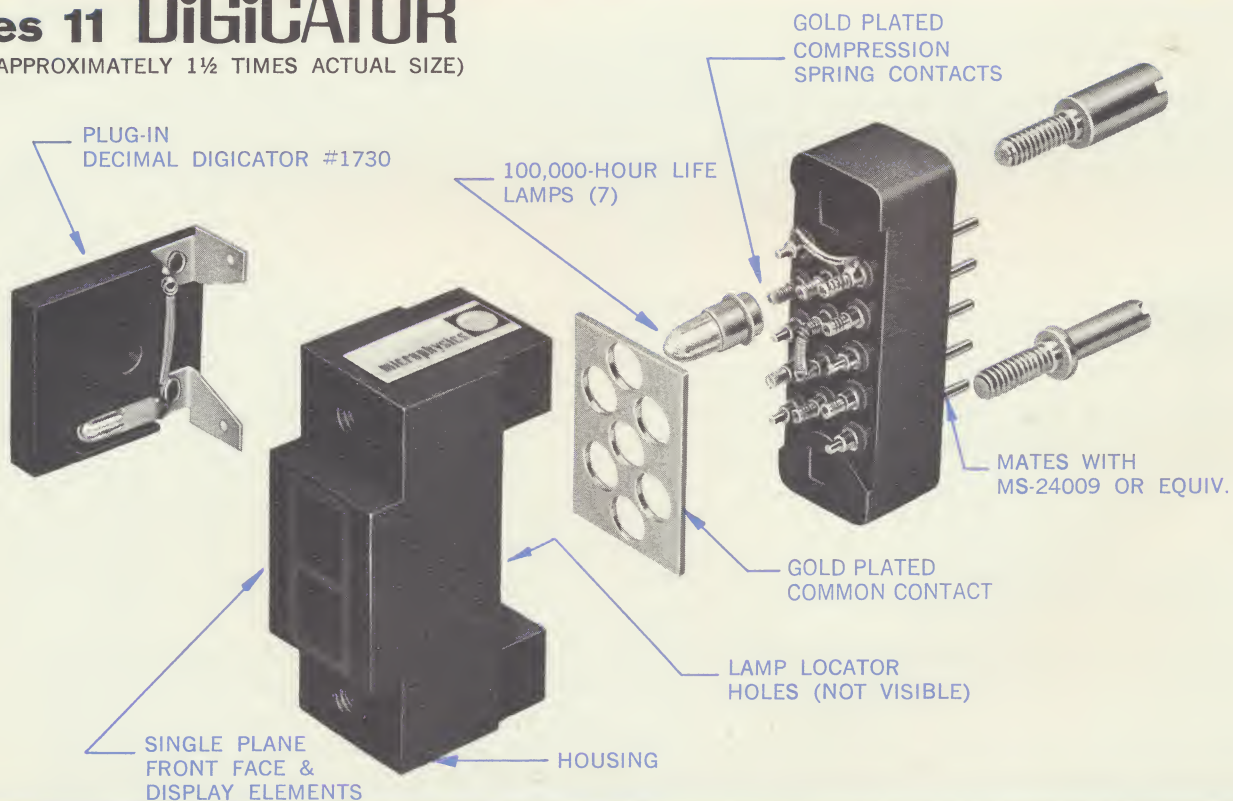
Series 10 DiGiCATOR

(SHOWN APPROXIMATELY 1½ TIMES ACTUAL SIZE)



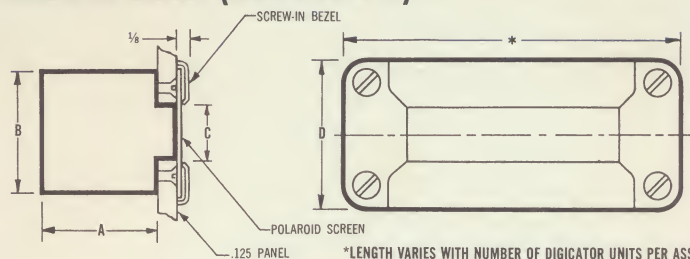
Series 11 DiGiCATOR

(SHOWN APPROXIMATELY 1½ TIMES ACTUAL SIZE)

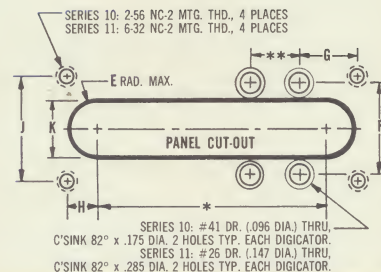


DIGICATOR MOUNTING STYLES

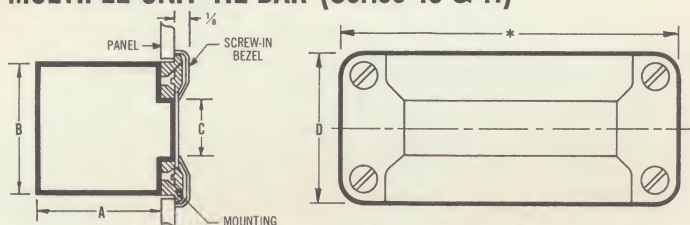
STYLE 1—REAR ACCESS, SCREW-IN BEZEL (Series 10 & 11)



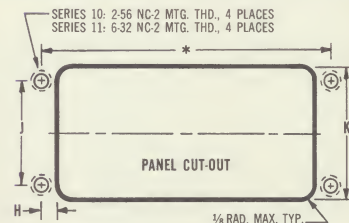
*LENGTH VARIES WITH NUMBER OF DIGICATOR UNITS PER ASSEMBLY.
 **.281 FOR SERIES 10 WITHOUT DECIMAL; .361 WITH DECIMAL
 .500 FOR SERIES 11 WITHOUT DECIMAL; .640 WITH DECIMAL



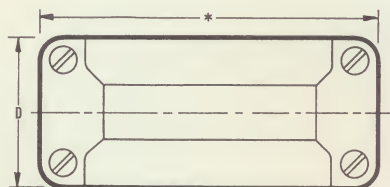
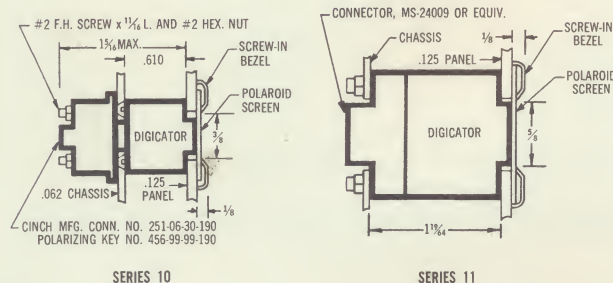
STYLE 2—FRONT ACCESS, MULTIPLE UNIT TIE-BAR (Series 10 & 11)



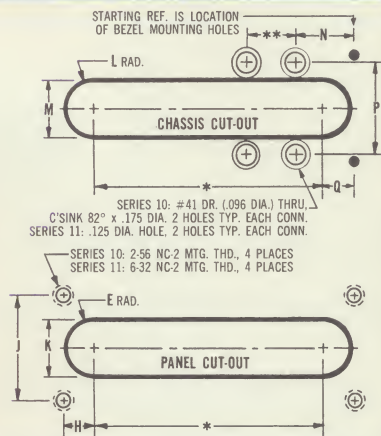
*LENGTH VARIES WITH NUMBER OF DIGICATOR UNITS PER ASSEMBLY.



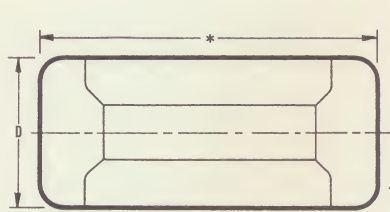
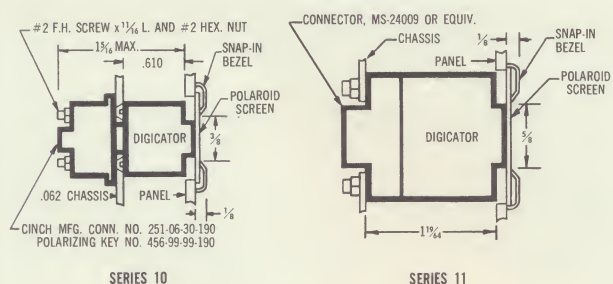
STYLE 3—PLUG-IN, FOR REMOVABLE FRONT PANELS



*LENGTH VARIES WITH NUMBER OF DIGICATOR UNITS PER ASSEMBLY.
 **.281 FOR SERIES 10 WITHOUT DECIMAL; .361 WITH DECIMAL
 .500 FOR SERIES 11 WITHOUT DECIMAL; .640 WITH DECIMAL



STYLE 4—PLUG-IN, FRONT MOUNTING, SNAP-IN BEZEL



*LENGTH VARIES WITH NUMBER OF DIGICATOR UNITS PER ASSEMBLY.
 **.281 FOR SERIES 10 WITHOUT DECIMAL; .361 WITH DECIMAL
 .500 FOR SERIES 11 WITHOUT DECIMAL; .640 WITH DECIMAL

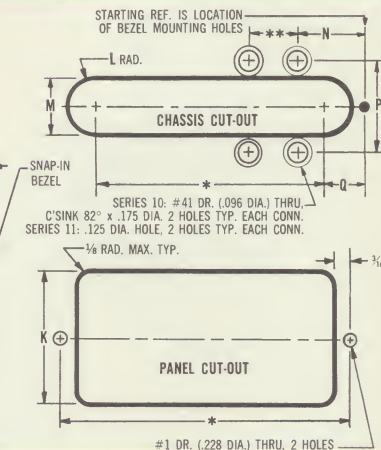


TABLE OF DIMENSIONS (in.)

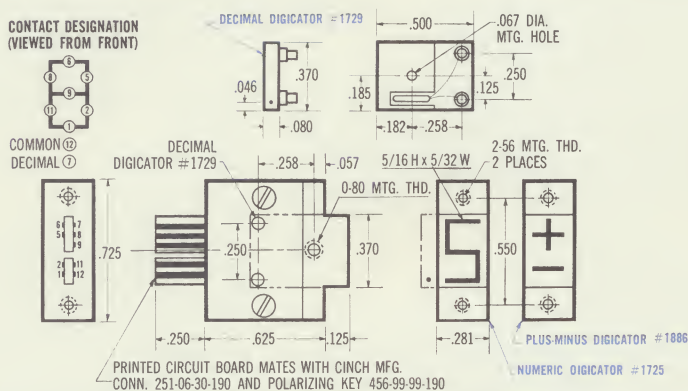
		A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
STYLE 1	Series 10	.625	.725	3/8	1 1/8	3/16	.550	.453	1/4	.750	.375	—	—	—	—	—
	Series 11	1 1/16	1 1/4	5/8	1 1/2	3/8	.937	.593	3/8	1.062	.625	—	—	—	—	—
STYLE 2	Series 10	.625	.725	3/8	1 1/8	—	—	—	3/32	.750	7/8	—	—	—	—	—
	Series 11	1 1/16	1 1/4	5/8	1 1/2	—	—	—	3/8	1.062	1 1/8	—	—	—	—	—
STYLE 3	Series 10	—	—	—	1 1/8	1/4	—	—	1/4	.750	1/2	3/16	3/8	.453	.550	1/4
	Series 11	—	—	—	1 1/2	1 1/32	—	—	3/8	1.062	1 1/16	3/8	3/4	.593	.937	3/8
STYLE 4	Series 10	—	—	—	1 1/8	—	—	—	—	—	1 1/16	3/8	3/8	.453	.550	1/4
	Series 11	—	—	—	1 1/2	—	—	—	—	—	1 1/8	3/8	3/4	.593	.937	3/8

SPECIFICATIONS ■ DiGiCATOR ELECTRONIC READOUTS

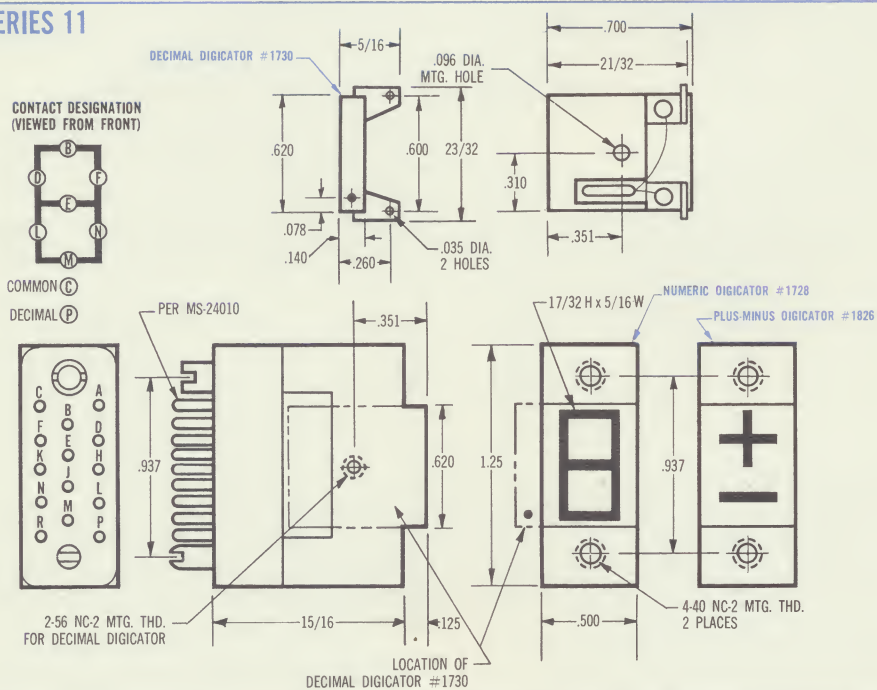
	Series 10			Series 11		
	Numeric DIGICATOR	Plus-Minus DIGICATOR	Decimal DIGICATOR	Numeric DIGICATOR	Plus-Minus DIGICATOR	Decimal DIGICATOR
PART NUMBER	1725	1886	1729	1728	1826	1730
NUMERAL SIZE, in.	$\frac{5}{16} \times \frac{5}{32}$	$\frac{5}{32} \times \frac{5}{32}$	.046 dia.	$\frac{1}{32} \times \frac{5}{16}$	$\frac{3}{32} \times \frac{5}{32}$	.062 dia.
LAMP VOLTAGE, volts	1.2	1.2	1.2	5.0	5.0	5.0
CURRENT, amps						
Min. ("1", 2 light elements)	.05	.027 all conditions	.027 all conditions	.12	.060 all conditions	.060 all conditions
Max. ("8", 7 light elements)	.19			.42		
Average (5 light elements)	.14			.30		
WEIGHT, ounces	.16	.16	.017	.64	.61	.054
LAMP TRADE NUMBER	MICROPHYSICS #1716			685 (MS 25515)		683 (MS 24367)
AVERAGE BRIGHTNESS, ft. lamberts	50*			50*		
LAMP LIFE, hrs.	600			100,000		
SWITCHING SPEED, millisec.	10			20		
TEMPERATURE RANGE, °F	Storage: -80 to 200 Operating: -65 to 125			Storage: -80 to 200 Operating: -65 to 125		
SHOCK	15 g's for 11 milliseconds			15 g's for 11 milliseconds		
VIBRATION	5 to 500 cps @ 5 g's			5 to 500 cps @ 5 g's		
RELATIVE HUMIDITY	100%			100%		
APPLICABLE MIL SPECS	MIL-E-4158, MIL-E-5400, MIL-E-5272			MIL-E-4158, MIL-E-5400, MIL-E-5272		

*Without high-contrast polaroid screen

SERIES 10



SERIES 11



HOW TO ORDER

DIGICATOR:

The standard Series 10 or Series 11 Numeric DIGICATOR readouts and their respective Decimal and Plus-Minus readouts may be ordered by specific MICROPHYSICS part numbers as indicated above.

SERIES 10 REPLACEMENT LAMPS:

Available from MICROPHYSICS as Part Number 1716.

***OTHER ITEMS:**

Bezel, screw-in (for mounting styles 1, 2, 3)
Bezel, snap-in (for mounting style 4)
Front tie-bar (for mounting style 2)
Polaroid screen (high-contrast 30% transmission)

*Part Numbers for these items will be assigned by factory after receipt of customer requirements, including the following information:

- A.** Series 10 or Series 11?
- B.** Number of Numeric and Plus-Minus DIGICATORS per assembly
- C.** Number of Decimal DIGICATORS per assembly
- D.** Location of Decimal DIGICATORS
- E.** Mounting style desired (see page 5)

microphysics  inc.

233 MAIN STREET
HUNTINGTON, N. Y.
(516) AR 1-0720

A Review of

CAPABILITIES
and **PRODUCTS**

microphysics inc.



233 MAIN STREET
HUNTINGTON, N. Y.
(516) AR 1-0720

was formed in 1962 to apply the innate advantages of small or miniature components and assemblies to devices where they could offer substantial product improvement.

Hence the name Microphysics

The approach we have taken at Microphysics is to examine the inherent advantages which flow out of designing small and thinking small. Here, of course, we mean the small linear dimensions in which, when examined, we find many attributes or physical properties taking on entirely different characteristics from those of large scale phenomena. For example, resonant frequencies of mechanical

components become ultrasonic at these small dimensions. Power to achieve reasonable forces becomes very low. Illumination from a light source is extremely high when close to the source. A high electric field can be achieved with low voltage when close to the electrode. Strength to weight ratio of small parts is fantastically higher than normal sized components.

BASIC ADVANTAGES

Use of small or miniature components can result in these basic advantages:

- Space and Weight Reduction
- Ruggedness and Reliability
- Power Saving
- Insensitive to Environment
- Lower Cost

Now, of course, these factors have all been well-known and is one of the reasons why transistor circuits and micrologic or integrated circuit approaches have received so much attention in the past few years. That is, the attention was directed there because these benefits of small size, ruggedness and low power flow directly out of the application of micro techniques to the fabrication of these devices.

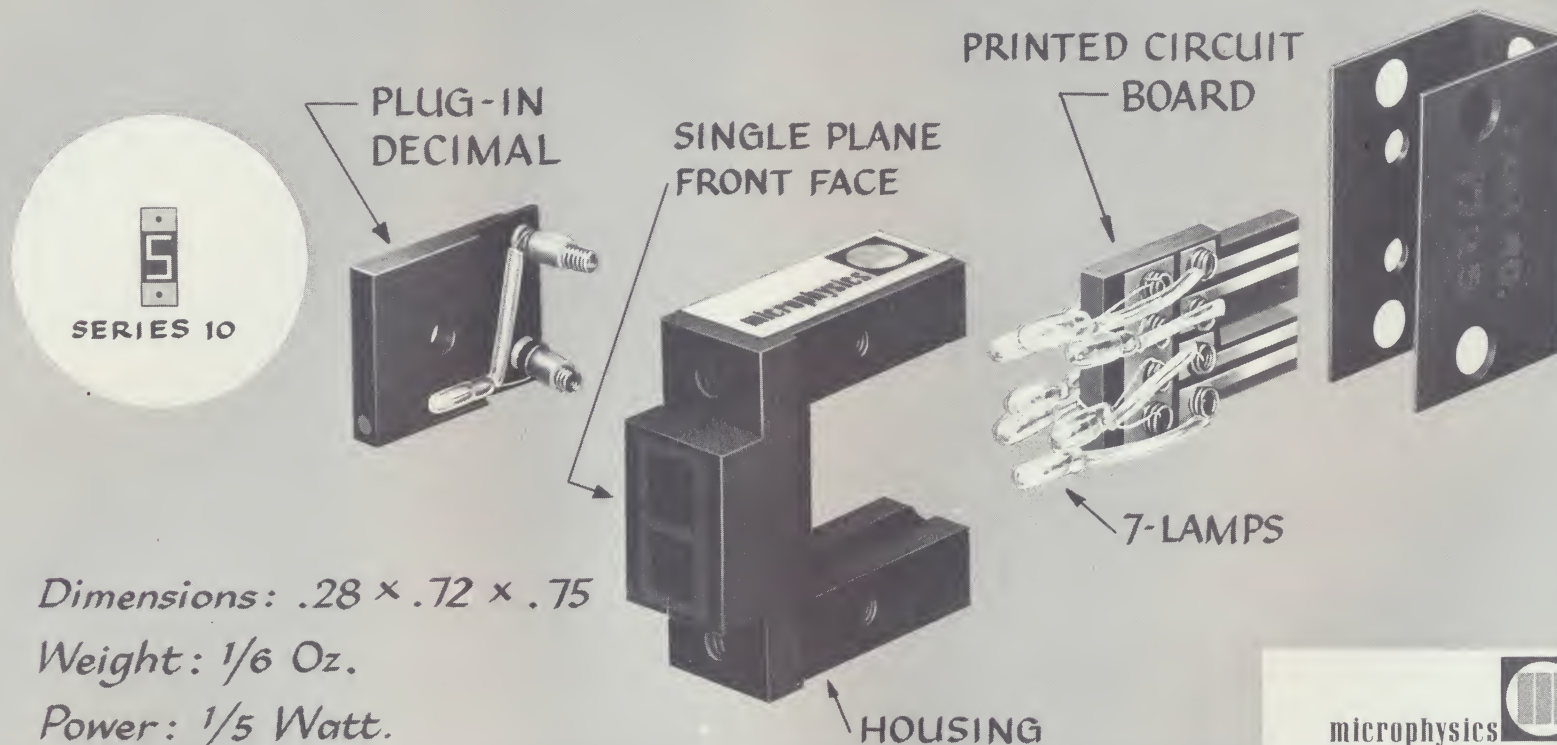
There is, however, a whole area which has been, let us say, almost by-passed in the push towards making practical micro-logic. This overlooked area we could characterize as using components having the dimensions of wristwatch parts and using the eye-loupe and tweezer assembly characteristic of that industry. It encompasses small mechanical, thermal, optical and electrical devices and the fabrication of these into wholly new products to achieve entirely new and advantageous characteristics. To date Microphysics has drawn upon this technology to develop the Digicator electronic readouts.

PRESENT APPLICATIONS :
ALPHA-NUMERIC READOUTS

DIGICATOR T.M.

SERIES 10


MINIMUM SIZE - POWER SAVING



Dimensions: .28 x .72 x .75

Weight: 1/6 Oz.

Power: 1/5 Watt.

microphysics  inc.

© 1964 Patent Pending

The smallest DIGICATOR is the Series 10 in which, using small lamps of low power, high brightness is nevertheless achieved since the lamps are placed close to the optical elements forming the numeric figure. In this size two versions are available; a relatively low-cost unit using 400 hour lamps suitable for battery operated equipment on a "push to read" basis compatible with normal battery operation for minimum current drain. The other uses 20,000 hour lamps for equipment where continuous oper-

ation is contemplated. Both, of course, are plug-in units and are completely field maintainable and depot repairable.

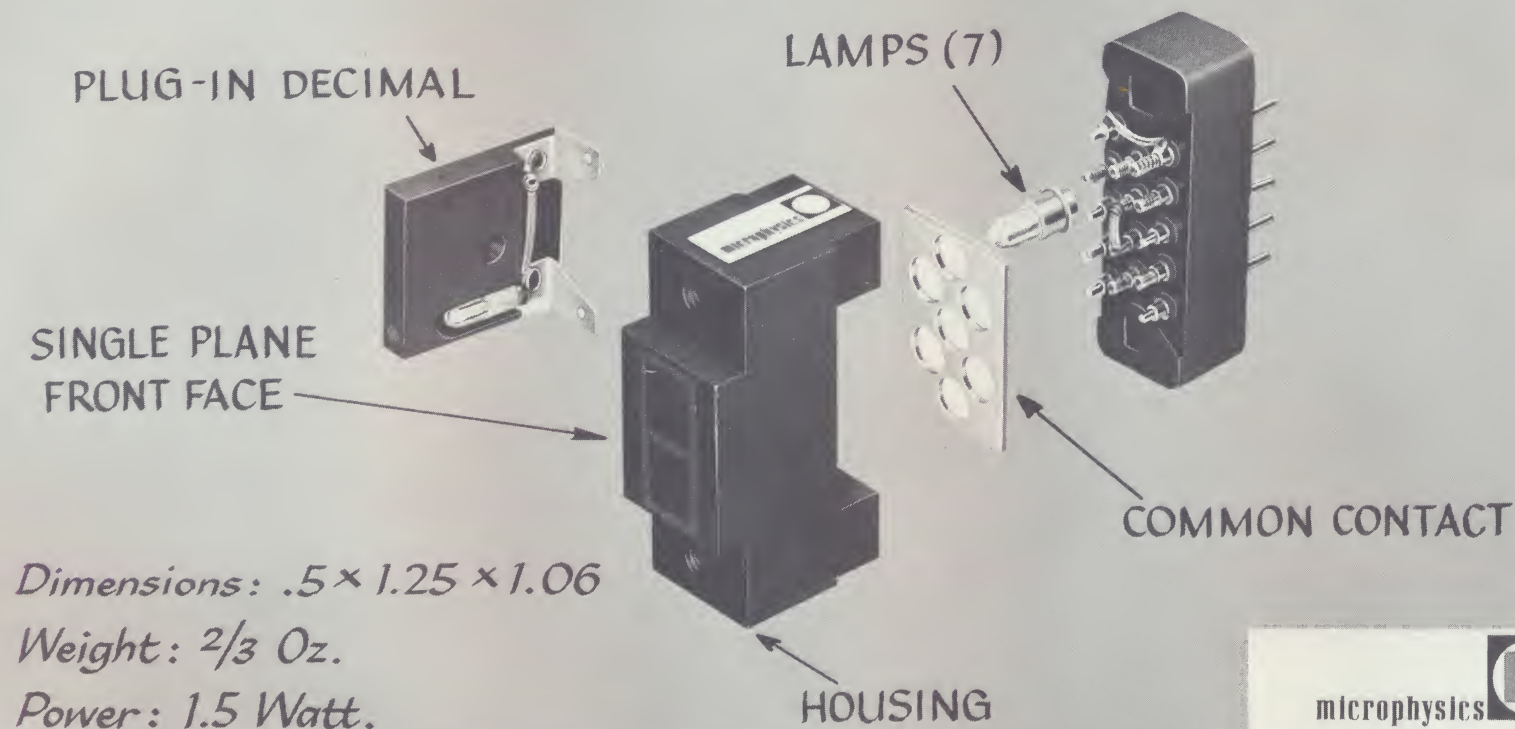
Two incidental, but nonetheless valuable, attributes of the basic design of the Digicators are the simplicity of check out and ease of brightness control. Merely lighting the "8" checks out all lamps. To dim all readouts in a display just one simple rheostat or small Variac is required.

PRESENT APPLICATIONS :
ALPHA-NUMERIC READOUTS

DIGICATOR™

SERIES 11

RELIABILITY - 100,000 HOUR LIFE



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In the Series 11 DIGICATOR the emphasis is on reliability and complete field repairability. It uses the proven T-1 lamp available from several lamp manufacturers and conservatively rated at 100,000 hours life. It has demonstrated structural integrity under various shock and vibration tests. Like all the

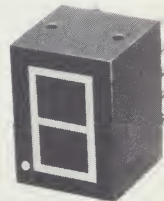
DIGICATORS, the character appears as a continuous line and does not appear segmented. The proprietary optical elements used exclusively by Microphysics gives the DIGICATOR a readability even under unfavorable conditions far superior to existing electronic readouts.

PRESENT APPLICATIONS:
ALPHA-NUMERIC READOUTS

DIGICATOR T.M.

SERIES 13

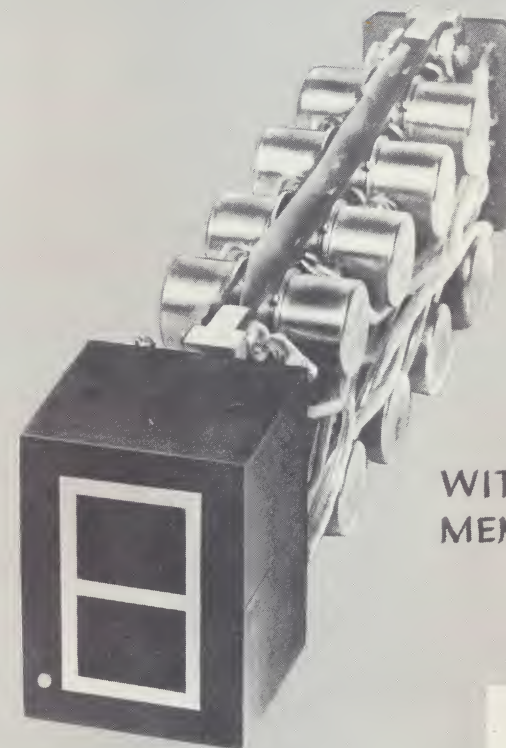
LOW COST - \$13.00




Dimensions: .75 x 1.00 x .8

Weight: 2/5 Oz.

Power: 2 Watts



**WITH
MEMORY CIRCUIT**

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The Series 13 DIGICATOR has been developed specifically for low-cost applications including instruments and industrial uses. Using low-cost T-1-3/4 lamps, the price becomes competitive with other types of readout. It offers the instrument manufacturer the lowest cost planar display known when the expense of the associated circuitry is taken into consideration. Cost of the Digicator itself is

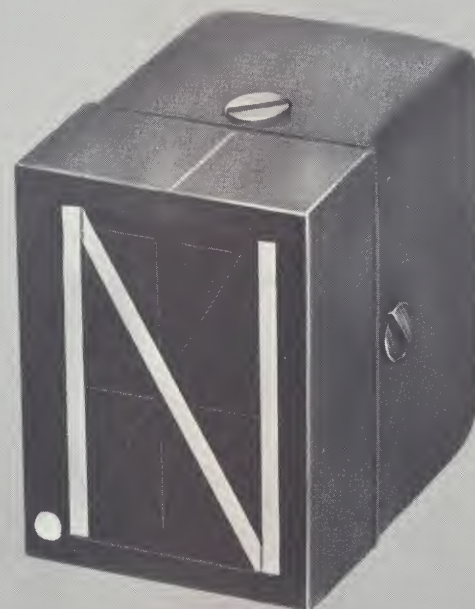
competitive with most other numeric readouts, and the components of the driving circuit cost far less. Yet it fits into a small panel space and is able to work an inexpensive power supply. It places a compatible single plane display within the hands of the industrial designer.

PRESENT APPLICATIONS:
ALPHA-NUMERIC READOUTS

DIGICATORTM

SERIES 14

COMPLETE ALPHA-NUMERIC




Dimensions: .750 × 1.00 × 1.125

Weight: 0.7 Oz.

Character Size: .54 × .84

Power: 2 Watts

microphysics  inc.

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In the presentation of alpha-numeric displays, the greatest factor is not the display element itself, but the fairly complicated problem of designing circuits which will translate some 40 separate characters into a display board and do this economically. The Series 14 DIGICATOR, because of its low voltage, low power design enables the system circuits to be achieved with very low cost components, thus

reducing to a minimum the in-place cost of a complete alpha-numeric presentation. However, it retains the flexibility of many types of input, including computer, typewriter, punch tape etc. The white, continuous line appearance of the characters enables the designer to give his customer an unambiguous display easily read even under high ambient light conditions.

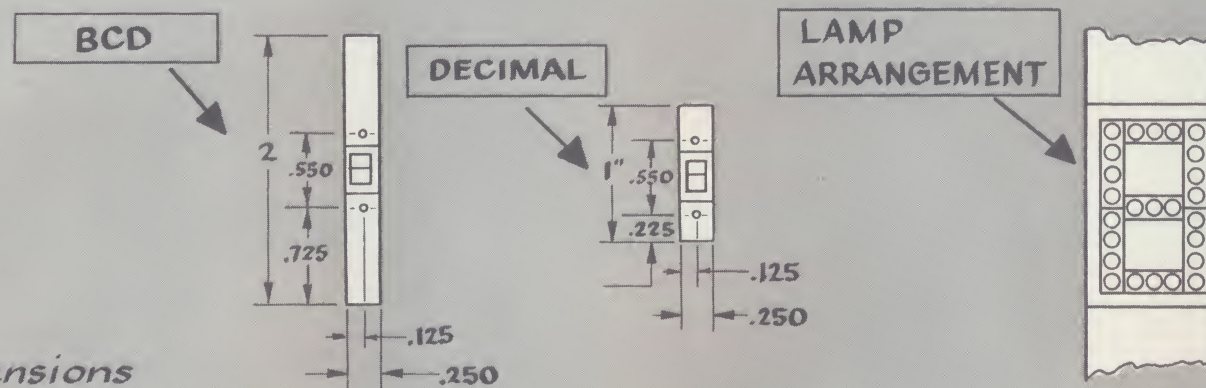
PRESENT APPLICATIONS :
ALPHA-NUMERIC READOUTS

600 FT. LAMBERTS NOMINAL
100,000 HOURS LIFE

DIGICATORTM

SERIES 15

HIGH BRIGHTNESS UNIT*
complete with Integral Converter Circuit



Dimensions

Numerals: $1/8" \times 7/32"$

BCD Overall: $1/4" \times 2" \times 13/8"$

Decimal Overall: $1/4" \times 1" \times 13/8"$

Power: $4/5$ Watts

* Design complete. Can be
supplied on 8 weeks lead time.

microphysics  inc.

© 1964 Patent Pending

The Series 15 DIGICATOR approaches the ultimate in reliability with lamp life ratings as high as 1 million hours. It is the latest unit in the line and was designed specifically for applications which require an electronic readout to be used under bright sunlight conditions. However, in addition to this intended application, it has excited considerable interest in fields where the long life and redundancy of lamp elements results in a unit with extremely high Mean Time Between Breakdown.

When this DIGICATOR is designed into equipment with long service life, the extra cost of the unit is more than justified by the extremely long service life. Since the viewer is looking directly at the lamp filaments, this DIGICATOR can be operated at 200 foot-lamberts with over a million hour lamp life up to 2000 foot-lamberts brightness with a lamp life of 1000 hours.

**PRESENT APPLICATIONS:
ALPHA-NUMERIC READOUTS**

SOME TYPICAL PERFORMANCE PARAMETERS

	SERIES 10	SERIES 11	SERIES 13	SERIES 14	SERIES 15
switching speed, ms	10	20	—	20	10
AVERAGE BRIGHTNESS ft. Lamberts	50	50	50	50	600
READABILITY Distance in ft.	15	25	35	35	12
ENVIRONMENT Shock	50g	50g	—	50g	50g
Vibration	20gs to 2000 cps		—	20gs to 2000cps	
Humidity	100%	100%	—	100%	100%
Temperature °F ^{Storage} ^{Operate}	-80 +200 -65 +125	-80 +200 -65 +125	— —	-80 +200 -65 +125	-80 +200 -65 +200
Altitude	deep space		—	deep space	

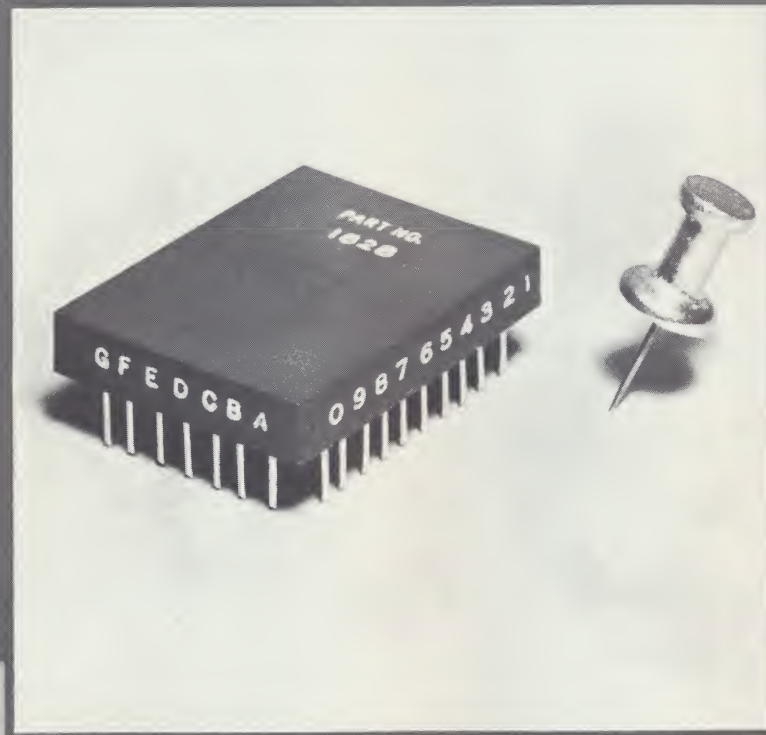
The current line of DIGICATORS presents a broad spectrum covering almost the complete readout field. As new designs, new materials and new lamps are developed, this design choice will of course be expanded. In addition to the alpha-numeric readouts, the design techniques available to us enable Microphysics to generate special characters and even patterns to meet specific applications. A

completely rounded capability for an entirely compatible display system exists at Microphysics. This is available in the form of individual components as required or on a complete subsystem responsibility if desired.

PRESENT APPLICATIONS:
DIODE-MATRIX

TYPICAL POTTED MODULE

DECIMAL → DIGICATOR LOGIC



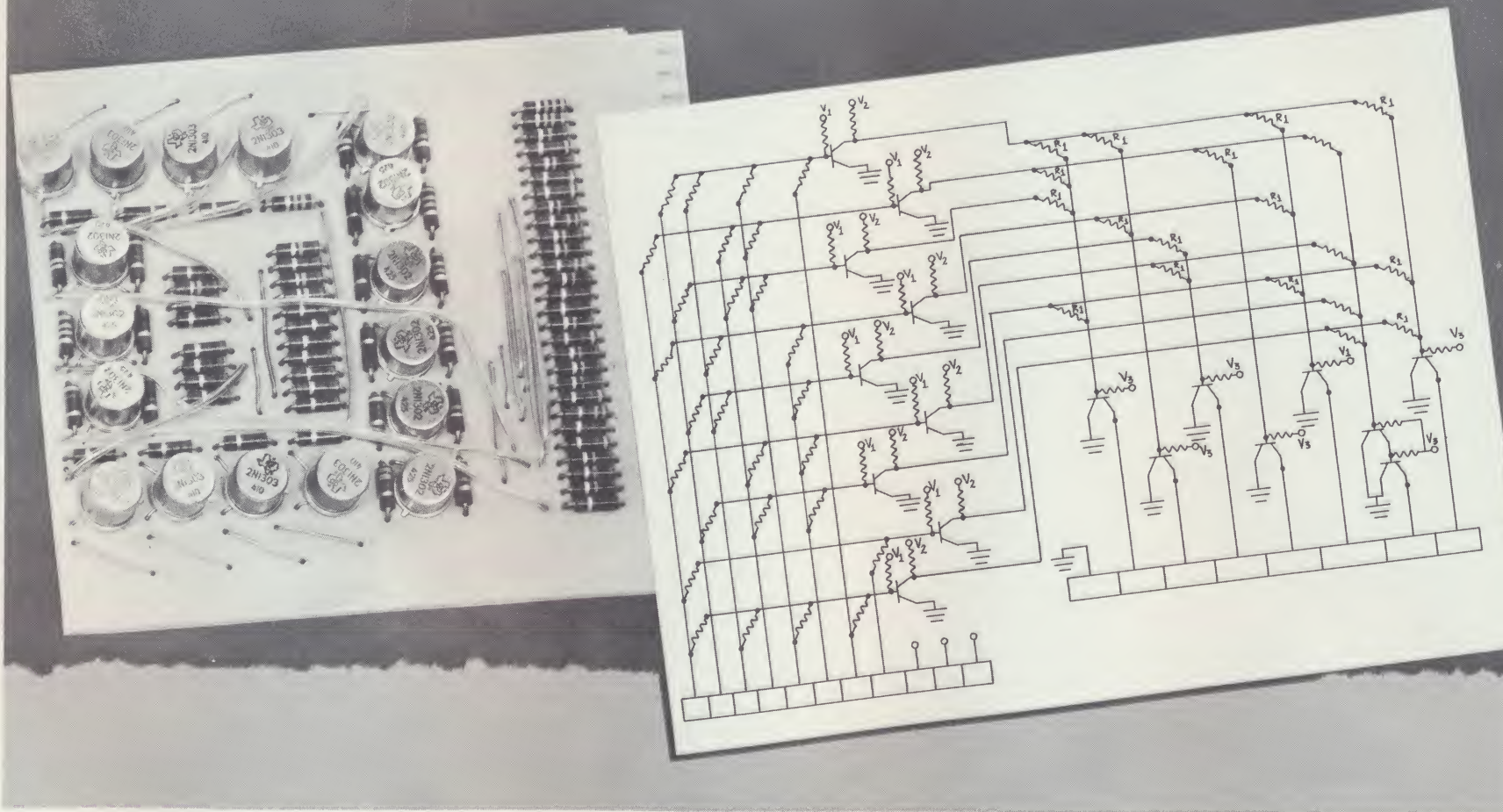
In the course of selling DIGICATORS it very rapidly became apparent to us at Microphysics that in order to apply these devices an extensive development had to be undertaken in the area of circuits and digital logic. This simple diode matrix is one of the most elementary of our circuits, yet for

its size, being only 1/4" thick and occupying only 1" x 1-1/2" of board area, it is one of the most economical ways of achieving digital logic. Of course, where large amounts of currents cannot be switched it is necessary to use some type of transistor resistor logic as shown on the next chart.

PRESENT APPLICATIONS: CIRCUITRY

CODE CONVERTER

BCD \rightarrow DIGICATOR LOGIC

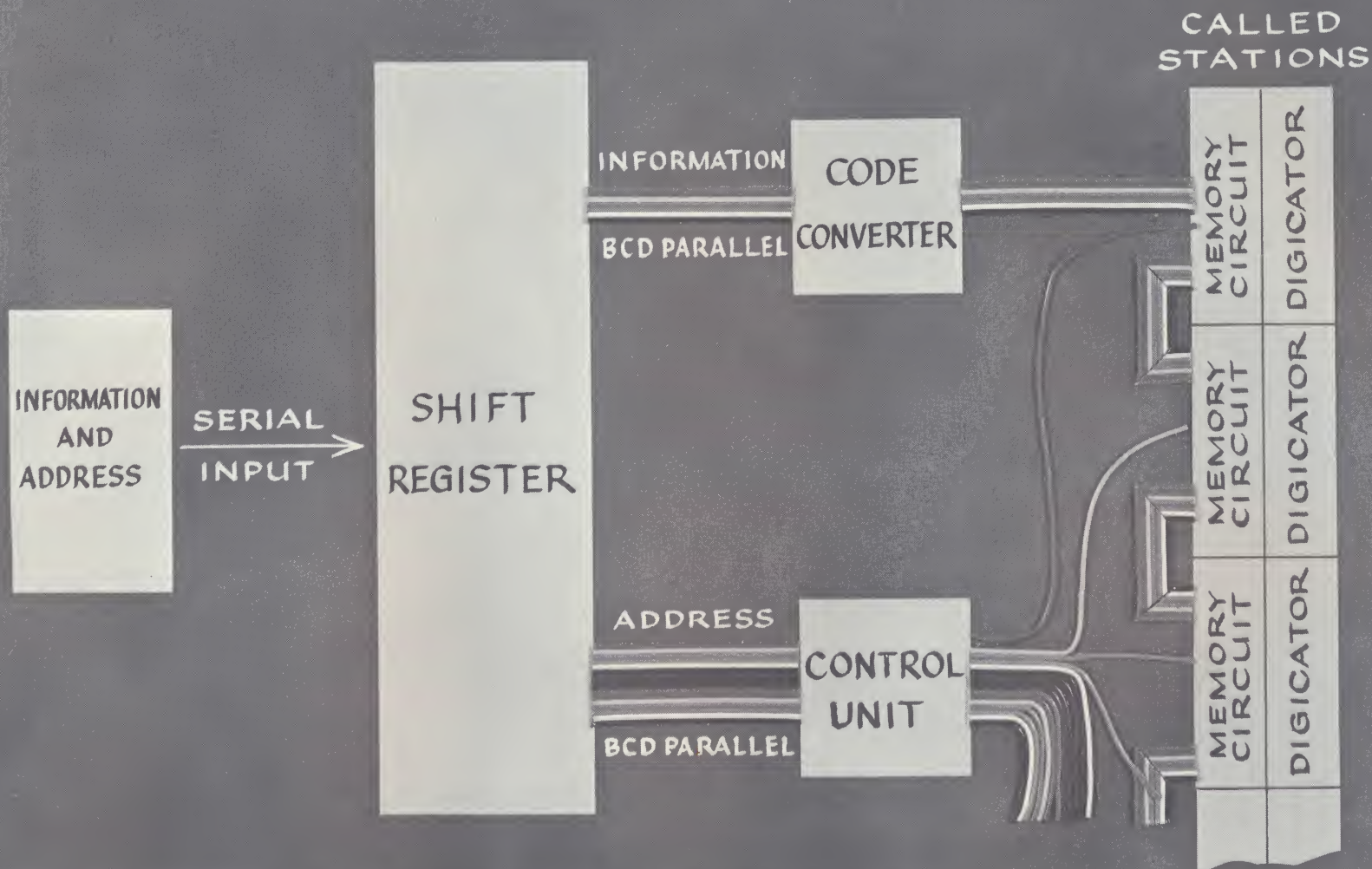


Various code converters have been developed at Microphysics. In addition to Binary Coded Decimal, or BCD, there are available decimal and octal input converters. They all use transistor resistor logic. The basic proprietary design consists of recognizing that most segments are on more often than off. Starting from the numeral 9 as a base, all other numbers can be converted by switching

"Off" or "On" the required elements. This results in a very simple matrix of relatively low current requirements so that straightforward resistor-transistor NOR logic can be utilized for BCD conversion in the usual manner.

PRESENT APPLICATIONS CIRCUITRY

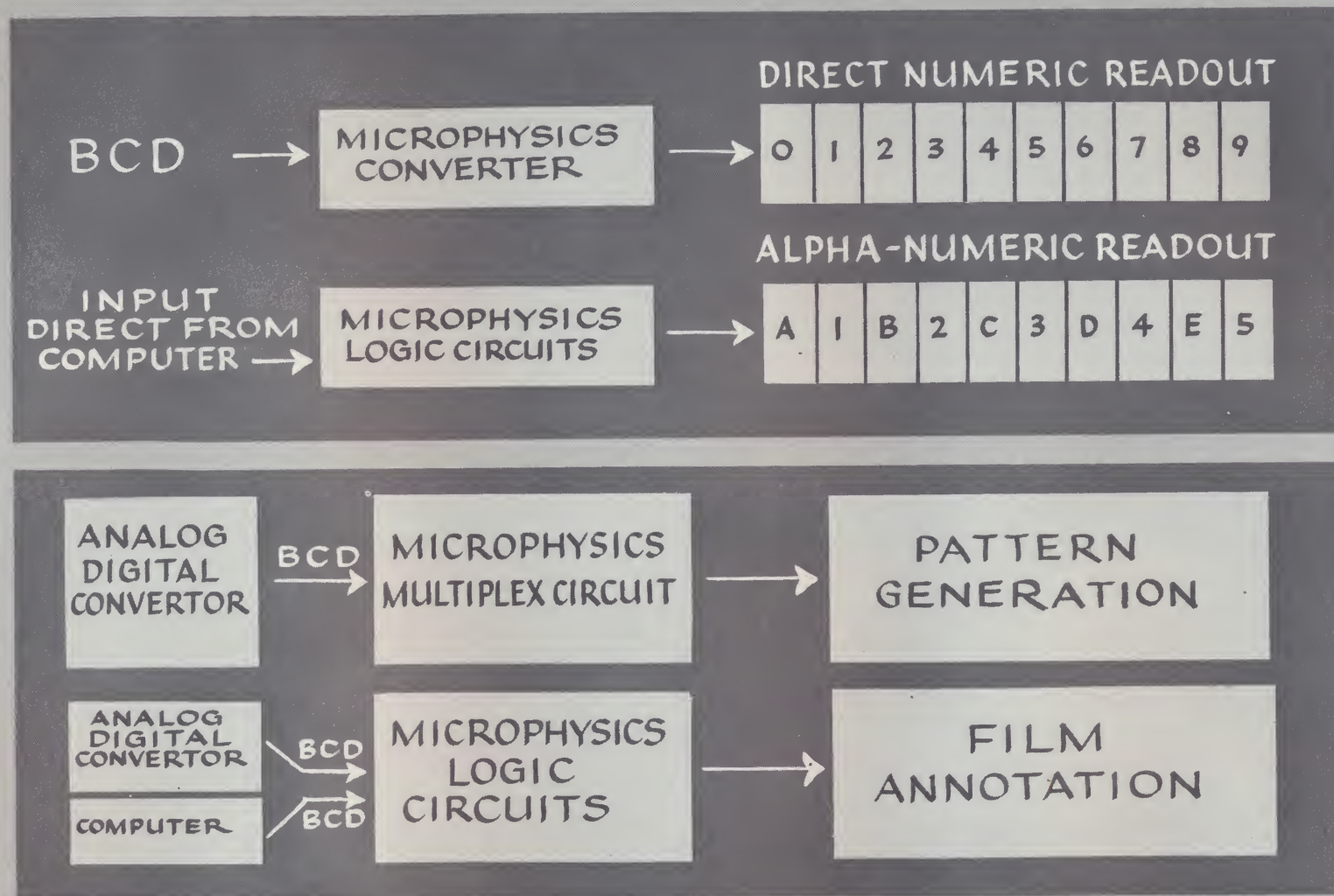
MULTIPLEXING



In complete readout packages we have been able to develop a multi-plexing system which does not depend upon high speed time-sharing circuits, but rather utilizes the driver circuit of the lamps in the DIGICATOR as a memory or latching circuit as well. Thus, once we have achieved the conversion from any type of information input we can direct this information on a "partyline" basis to any of a large number of addresses. The Control Unit selects the required address and enters the information to only that address upon command. Other addresses retain previous information undisturbed. Of course, the conversion techniques that are utilized are quite general and are capable of conversion not

only to the particular problem of selecting the lamp signals in the DIGICATOR but the creation of a wide variety of pattern generators. Also, of course, the switching techniques are just as easily applicable to voice communication, telemetering of information, or any place where the receipt of serial or parallel information must be distributed to pre-designated addressed locations. The system has particular economic advantages when used with the Series 14 DIGICATOR to create a complete Alpha-Numeric display.

GENERAL APPLICATIONS

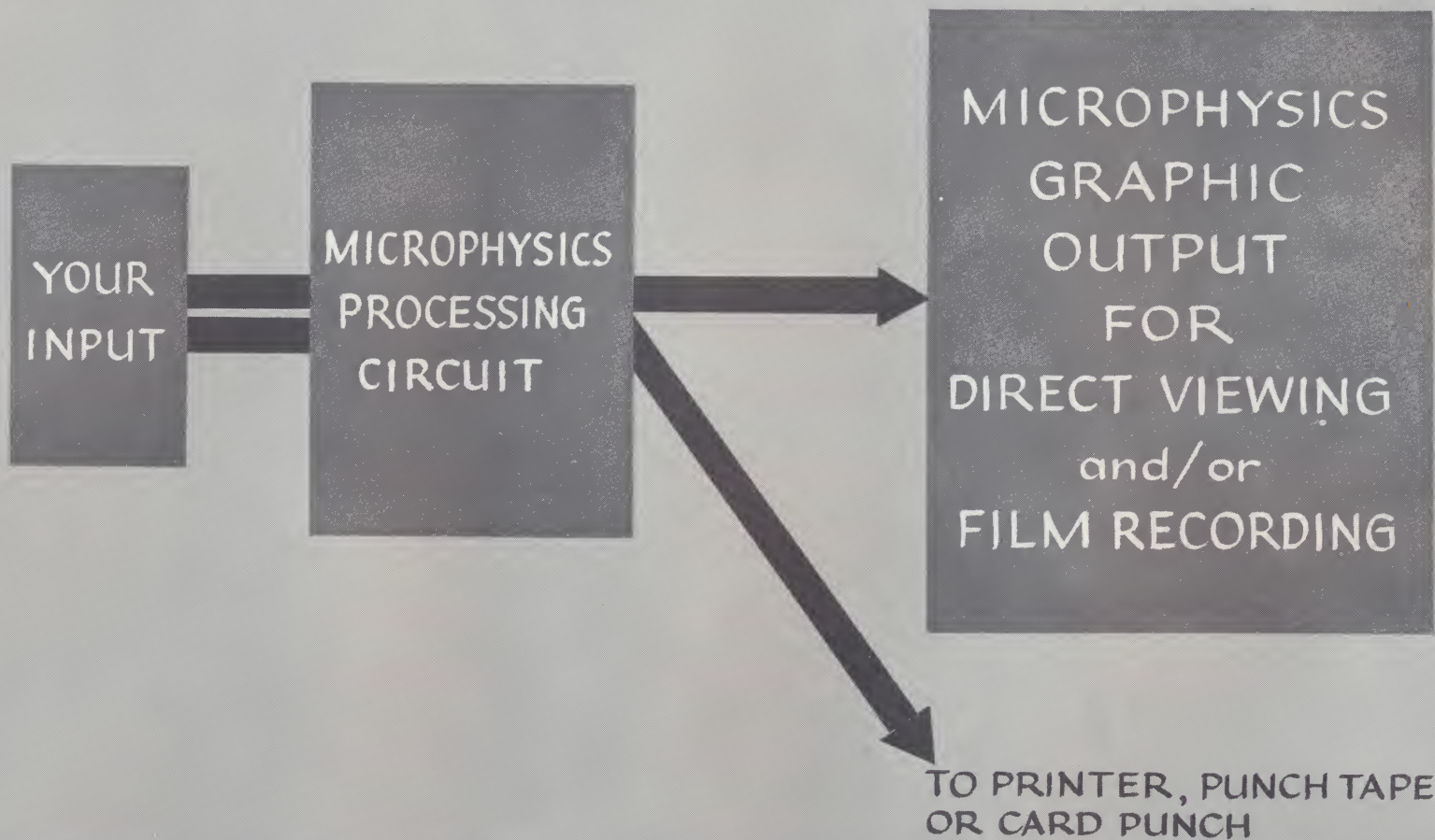


Microphysics has the capability of executing complete sub-system design, development, and fabrication for a wide variety of peripheral data problems. The matching of interfaces becomes a problem of the sub-system not of the computer or data link, and of course this can be done in devices which are inherently environment proof, and at small package sizes.

The general nature of the digital logic techniques used enable the system to service auxiliary equipment at very little increase in system cost or complexity.

GENERAL APPLICATIONS

GRAPHIC DISPLAY



In general the basic Microphysics multiplexing approach can be quickly applied to a wide variety of digital data conversion problems. Using standard circuit modules, compatible with one another, complete application engineering is done at the proposal level. Delivery of hardware can thus be made within short lead times. As a sample of package size, we can put a complete ten position numeric

readout, with multiplexing and code conversion in a space behind the panel of only six cubic inches including connector, with an auxiliary control system of only seven cubic inches and connected by a flat ribbon cable only one inch wide. And, the system is plug-in modular repairable and serviceable, with all modules capable of depot repair.

GENERAL APPLICATIONS

SOME POTENTIAL USES

DIRECT DISPLAY

- LATITUDE-LONGITUDE
- LIQUID QUANTITIES
- NUCLEAR FLUX DENSITY
- QUIET CALL SYSTEM
- PATIENT MONITORING, REMOTE
(Temp., Pulse Rate, etc.)
- PROCESS MONITORING
- CONTROL SURFACE POSITION
(Rudder Angle - Flap Angle, etc.)
- DIRECT READING ALTIMETER
- DIRECT READING DEPTH

FILM RECORDING

- AUXILIARY DATA ANNOTATION
- FILE CODING OF
MICROFILM
- DIRECT ALPHA-NUMERIC
DATA RECORDING AT
HIGH RATES
- FILM TITLING
- FRAME NUMBERING
- LINE PRINTER

Right now this capability is being applied to numeric and alpha-numeric displays, which of course include display of special symbols, latitude and longitude indications, immediate visualization of Flexiwriter inputs as well as the normal application for readouts such as instrument panels and direct computer readouts. Other applications being contemplated include the use of the DIGICATOR in photographic applications. Here, rather than having a DIGICATOR element which gives a bright surface which can be viewed from any angle, Microphysics has developed condenser lens and collimating systems which can confine the light output to a narrow angle perpendicular to the face of the DIGICATOR,

thus allowing short exposure times. Applications here have included titling of photographed objects as well as generating code patterns for future scanning of the developed films. In addition, the small size of the optical elements allows, in some applications, the numeral or pattern generator to be included directly in the camera. Because the lamp filaments are of such small size that the thermal response is very rapid (10 milliseconds for the Series 10 DIGICATOR), fairly high framing speeds can be achieved.

IN SUMMARY

Microphysics Inc. has a developed and demonstrated capability for the creation of devices and equipment which capitalizes on the attributes and physical properties which can occur when linear dimensions are kept minute. Among these are:

- Ultimate Rigidity • Substantially Lower Power Requirements • Exceptional Response Speed • Insensitive to Environment • Extremely High Strength-Weight Ratio
- High Structural Integrity • Inherent Reliability and Long Life

A closer look should be taken at what we mean by environment proof. Aside from being rugged, because of small size and light weight, the fact that the devices generate relatively low power and use low voltage means that auxiliary driving equipment can be simple and uncomplicated. This, of course, lends itself to reliable operation in the long run. Semi-conductor circuits are run at low voltages which achieve the two-fold effect of vastly enhancing the reliability of the semi-conductor elements and enable us to use the inexpensive section of the semi-conductor industry output. Not previously

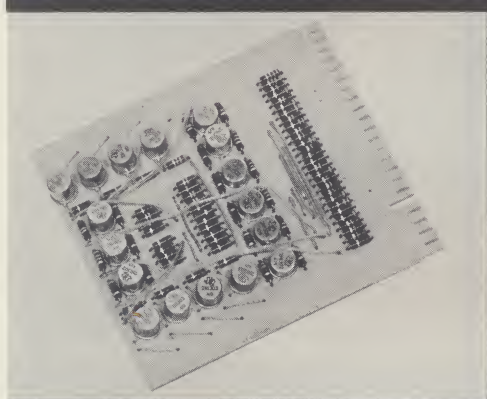
mentioned is the fact from any of the DIGICATORS radio frequency interference is not a problem in that the radiation from the filaments of the lamps is of such a low intensity that no shielding is required. The design philosophy at Microphysics is to make the interface problem one which is solved by the Microphysics system. Thus a system designed for computer output uses the computer's power supply levels and requires only normal programming at normal logic level outputs.

microphysics inc.

233 MAIN STREET
HUNTINGTON, N.Y.
TEL. 516-271-0720
TWX 516-421-4562

DECIMAL & BINARY CODED DECIMAL LOGIC CONVERTERS
FOR SERIES 13 DiGiCATOR™. ELECTRONIC NUMERIC READOUTS

Advance Data 2731
May, 1964



New low cost, plug-in printed circuit converters feature exclusive transistor-resistor logic with low current requirements.

Two standard types are available:

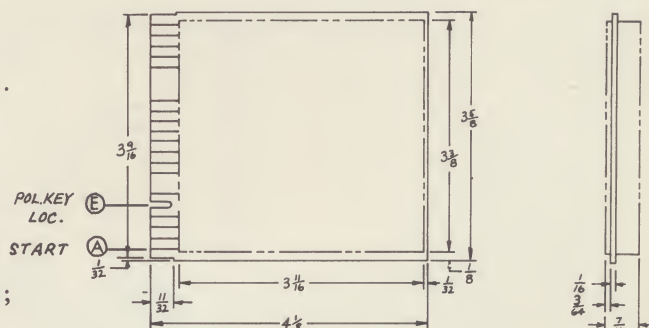
No. 2027 - B.C.D.

No. 2031 - DECIMAL

Developed for use with MICROPHYSICS' Series 13 DiGiCATOR, these logic converters utilize a proprietary design which recognizes that most DiGiCATOR segments are ON more often than OFF. Starting from the numeral 9 as a base, all other numbers can be converted by switching OFF or ON the required elements. This results in a very simple resistor matrix of relatively low current requirements so that straight-forward resistor-transistor NOR logic can be utilized for BCD conversion in a conventional manner.

NOTES:

1. Converter mounts into 22 contact, .156 spacing, printed circuit connector for 1/16" board. Connector spacing should be 1/2" center-to-center.
2. Supplies —
Converter No. 2027: -6 VDC $\pm 10\%$ at .026 amp;
+6 VDC $\pm 10\%$ at .13 amp
Converter No. 2031: -6 VDC $\pm 10\%$ at .020 amp
3. Logic Levels —
Converter No. 2027: "1", +6 VDC $\pm 10\%$;
"0", Zero to +0.3 VDC
Converter No. 2031: Selected digit, +6 VDC $\pm 10\%$;
Others, Zero to +0.3 VDC
4. Logic Drive —

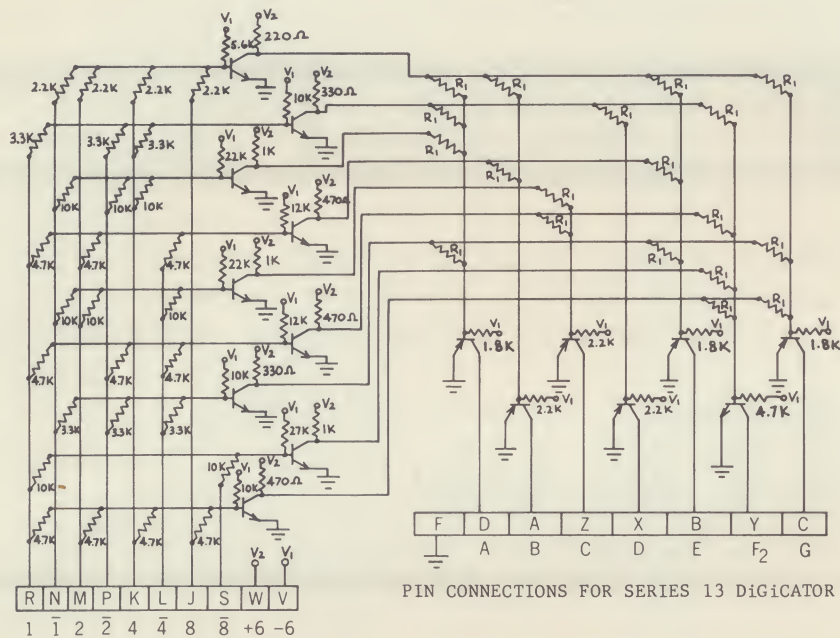


Converter No. 2027			Converter No. 2031		
BIT	REQ'D CURRENT, amps	MAX. RES. FROM +6V, ohms	DIGIT	REQ'D CURRENT, amps	MAX. RES. FROM +6V, ohms
1	.0035	680	1	.012	220
$\bar{1}$	.0032	750	2	.009	330
2	.0033	750	3	.003	1000
$\bar{2}$	.0031	750	4	.006	470
4	.0036	680	5	.003	1000
$\bar{4}$	.0028	820	6	.006	470
8	.0022	1100	7	.009	330
$\bar{8}$	.0004	6200	8	.003	1000
			9	ZERO	INFINITE
			0	.006	470

5. DiGiCATOR Lamp Supply —
-10.2 VDC to pin H of DiGiCATOR; +10.2 VDC to pin F₁ of DiGiCATOR (may be unfiltered full-wave rectified A.C. from bridge rectifier with center tapped transformer secondary). Display can be dimmed by simply varying the lamp supply voltage.
6. Temperature Rating —
Storage: -80° F to 200° F; Operating: -65° F to 125° F

(SEE OTHER SIDE FOR CIRCUIT SCHEMATICS AND PRICE LIST)

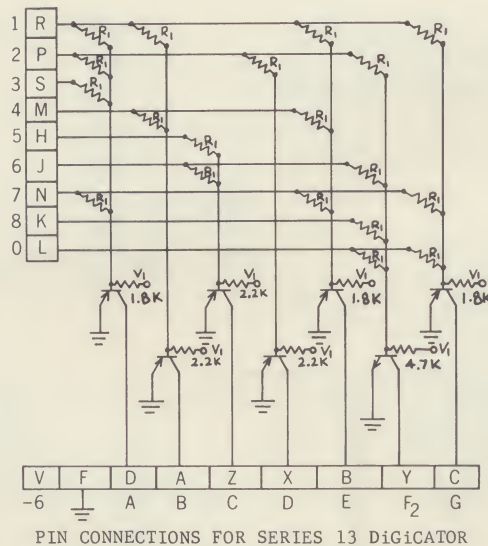
SCHEMATIC, CONVERTER No. 2027 (BCD)



NOTES:

1. All resistors 1/4 watt, 10%
2. $R_1 = 1K$
3. All PNP transistors - 2N404
4. All NPN transistors - 2N1302

SCHEMATIC, CONVERTER No. 2031 (DECIMAL)



PRICE, each

QUANTITY	1-9	10-99	100-249	250-999	1000 and over
BCD CONVERTER No. 2027	41.00	36.50	32.50	29.00	26.00
DECIMAL CONVERTER No. 2031	24.00	21.50	19.50	17.00	15.00

Note: If different logic levels or power supply voltages are required, prices for special converters will be quoted. Often, these special converters are priced the same as standard units listed.

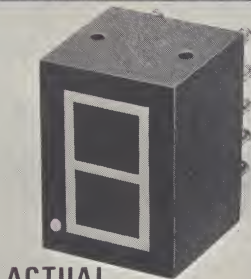
Other converters, for use with MICROPHYSICS Series 10 and 11 DiGiCATORS, are also available. Forward application data including logic levels, driver current, packaging, temperature, etc.

microphysics inc.

233 MAIN STREET
HUNTINGTON, N.Y.
TEL. 516-271-0720
TWX 516-421-4562

SERIES 13 DiGiCATORTM ELECTRONIC NUMERIC READOUTS

Advance Data 9010
May, 1964



ACTUAL
SIZE

New Series 13 DiGiCATOR Readouts feature simplified, rugged design for commercial applications.

- MAXIMUM USE OF PANEL SPACE
- 20,000 HOUR LIFE LAMPS
- LOW COST - FROM \$13 EACH

No. 1829 - Numeric (built-in decimal point)
No. 1890 - Numeric
No. 2001 - Plus-Minus

- SPACE-SAVING DISPLAY. Larger numeral display (15/32" W x 3/4" H) in smaller overall package (only 3/4" W x 1" H) permits side-by-side flush installation for maximum utilization of available panel space — requires less width and height than other types of readouts.
- NUMERAL, DECIMAL, PLUS-MINUS. Numeral display "0" through "9." Integral decimal point on No. 1829. Separate plus-minus unit. Other displays on special order.
- RUGGED DESIGN - NO MOVING PARTS. Display elements embedded in DiGiCATOR head, separately lighted to form numeral. Printed circuit boards.
- HIGHEST BRIGHTNESS & READABILITY. Incandescent lamps. White, bright, sharp display — clearly readable under all normal ambient lighting conditions.
- DIMMING CONTROL. Can be directly dimmed by simply varying the lamp input voltage.
- IMPROVED SHARPNESS & CONTRAST. At least an order of magnitude sharper than neon, glow-tube, or projection type indicators. Contrast emphasized and glare minimized by use of polaroid screen.*
- FLAT, SINGLE-PLANE DISPLAY. No projection lenses or stacked plates. No parallax or depth distortion. Unlimited viewing angle. Entire display in sharp focus.
- HIGH RELIABILITY. Only 7 elements in the standard numeric DiGiCATOR, compared to at least 10 in most other types. 30% less wiring for logic circuits. Quick, positive testing of lamps and light elements.
- BRACKET MOUNTING. Two tapped holes in top of unit.
- FIELD-REPLACEABLE LAMPS. DiGiCATORS can be easily disassembled for individual lamp replacement. No special tools required.
- NO HUMIDITY PROBLEM. Low impedance circuits, electrical leakage not critical.
- NO CORONA PROBLEM. Low voltage levels eliminate corona effects.

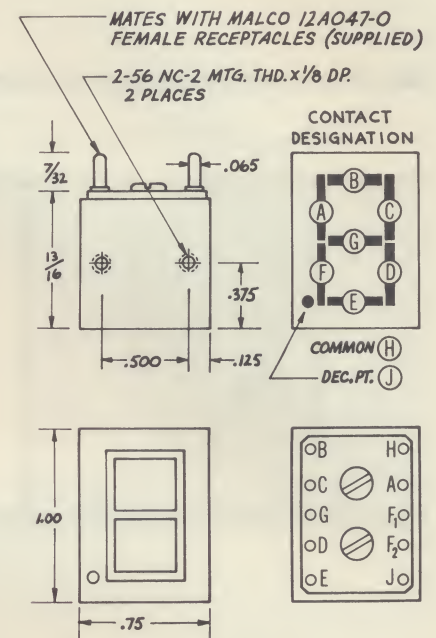
* Recommended material for screen is HNCP37, available from Polarizer Division, Polaroid Corp., Cambridge 39, Mass.

(SEE OTHER SIDE FOR SPECIFICATIONS AND PRICES)

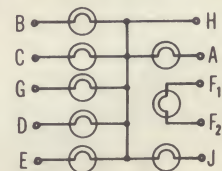
SPECIFICATIONS, Series 13 DiGiCATOR

	Numeric DiGiCATOR (With Dec. Pt.)	Numeric DiGiCATOR	Plus-Minus DiGiCATOR
PART NUMBER	1829	1890	2001
OVERALL SIZE, WxHxD, in.	.75 x 1.00 x .81	.75 x 1.00 x .81	.75 x 1.00 x .81
NUMERAL SIZE, WxH, in.	15/32 x 3/4	15/32 x 3/4	7/16 x 7/16
DECIMAL PT. SIZE, Dia., in.	1/16	—	—
LAMP VOLTAGE, volts	10.0*	10.0	10.0
CURRENT, amps Min. ("1", 2 light elements) Max. ("8", 7 light elements) Average (5 light elements)	.08* .28* .20*	.08 .28 .20	.04 all conditions
LAMP LIFE, hours	20,000	20,000	20,000
AVERAGE BRIGHTNESS, ft. lamberts	50	50	50
READABILITY DISTANCE, ft.	35	35	35
LAMP TRADE NUMBER	2107 & 683	2107	2107
WEIGHT, ounces	.44	.44	.40
TEMPERATURE RANGE, °F	Storage: -80 to 200; Operating: -65 to 125		

*Values shown are for numeral elements. For decimal point, voltage is 6.6 volts @ 60 ma



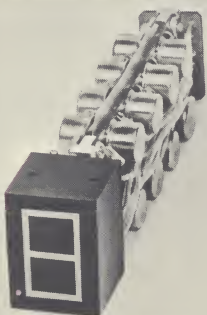
ELECTRICAL SCHEMATIC (No. 1829)



PRICE, each

ORDERING QUANTITY	No. 1829	No. 1890	No. 2001
1-9	24.00	21.00	14.50
10-99	21.50	18.50	13.00
100-249	19.50	16.50	11.50
250-999	17.00	14.50	10.00
1000 and over	15.00	13.00	9.00

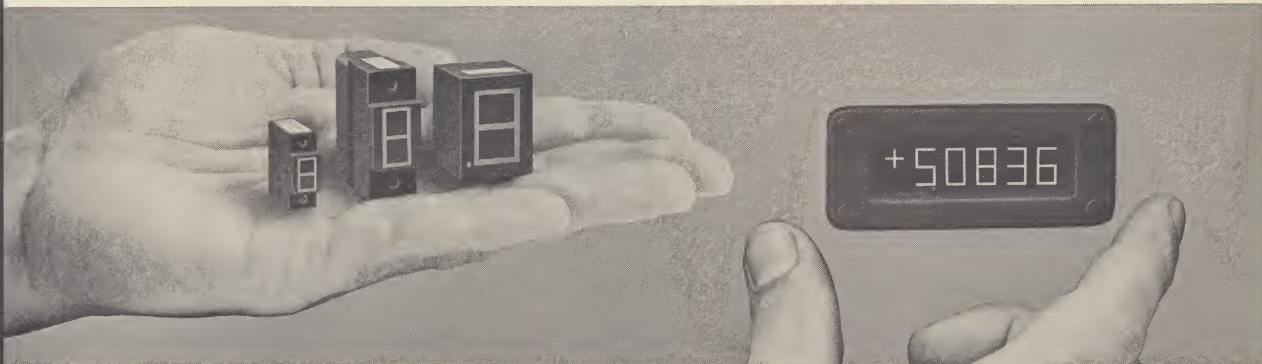
LOW-COST LOGIC CONVERTERS AVAILABLE FROM STOCK! — See MICROPHYSICS Data Sheet #2731 for complete description and schematics of DECIMAL and BINARY CODED DECIMAL Logic Converter Modules for use with Series 13 DiGiCATORS.



Series 13 DiGiCATORS are also available with BUILT-IN logic converter circuits. Prices and additional information will be supplied on request.

DIGICATOR^{T.M.}

ELECTRONIC NUMERIC READOUTS



A READOUT FOR EVERY APPLICATION

CHOOSE FROM MICROPHYSICS' THREE NEW SERIES
OF ADVANCED ELECTRO-OPTICAL INCANDESCENT READOUTS:

SERIES 10 MICROMINIATURE! (MIL Specs)

SAVE SPACE, 6 digits in only 1 3/4" — SAVE WEIGHT, 6 digits weigh only 1 oz. — SAVE POWER, 6 digits require only 1 1/2 watts.
PRICE — Low as \$25, in production quantities.

SERIES 11 ULTRA LONG-LIFE! (MIL Specs)

Slightly larger than Series 10. Rugged design, featuring maximum reliability with rated lamp life of 100,000 hours.
PRICE — Low as \$23.50, in production quantities.

SERIES 13 LOW COST!

(Commercial Version)
Includes all the important features of Series 10 and 11. Available with built-in decimal point and integral driver circuits.
PRICE — Low as \$13, in production quantities.

PLUS A COMPLETE SELECTION OF LOW-COST INPUT CONTROL LOGIC CONVERTERS & CIRCUITS

DECIMAL, BINARY CODED DECIMAL, MEMORY CONTROL, MATRIX MODULES, TRANSISTOR DRIVERS, SWITCHING SYSTEMS, SPECIAL PURPOSE DRIVERS

Pick the components you need from our stock to work out your system — from a simple signal indicator to a complete command and control presentation.

■ **NUMERAL, DECIMAL, PLUS-MINUS.** Numeral display "0" through "9." Side-saddle mounted decimal point. Separate plus-minus unit. Other displays on special order.

■ **RUGGED DESIGN — NO MOVING PARTS.** 7 display elements embedded in DIGICATOR head, separately lighted to form numeral. Printed circuit boards. Compact construction, resistant to shock and vibration.

■ **HIGHEST BRIGHTNESS & READABILITY.** Incandescent lamps. White, bright, sharp display — clearly readable under all normal ambient lighting conditions.

■ **DIMMING CONTROL.** Can be directly dimmed by simply varying the lamp input voltage.

■ **IMPROVED SHARPNESS & CONTRAST.** At least an order of magnitude sharper than neon, glow-tube, or projection type indicators. Contrast emphasized and glare minimized by polaroid screen.

■ **FLAT, SINGLE-PLANE DISPLAY.** No projection lenses or stacked plates. No parallax or depth distortion. Unlimited viewing angle. Entire display in sharp focus.

■ **HIGH RELIABILITY.** Only 7 elements in each numeric DIGICATOR, compared to at least 10 in most other types. 30% less wiring for logic circuits. Quick, positive testing of lamps and light elements.

■ **4 MOUNTING STYLES.** Rear access, front access, plug-in, snap-in bezel. All mounting hardware available from MICROPHYSICS.

■ **FIELD-REPLACEABLE LAMPS.** DIGICATORS can be easily disassembled for individual lamp replacement. No special tools required.

■ **HIGH SWITCHING SPEED.** 10 milliseconds for Series 10, 20 milliseconds for Series 11.

■ **NO HUMIDITY PROBLEM.** Low impedance circuits, electrical leakage not critical.

■ **NO CORONA PROBLEM.** Low voltage levels eliminate corona effects.

SHORT-FORM SPECIFICATIONS	SERIES 10			SERIES 11			SERIES 13	
	Numeric DIGICATOR	Plus-Minus DIGICATOR	Decimal DIGICATOR	Numeric DIGICATOR	Plus-Minus DIGICATOR	Decimal DIGICATOR	Numeric DIGICATOR	Plus-Minus DIGICATOR
PART NUMBER	1725	1886	1729	1728	1826	1730	1890*	2001
OVERALL SIZE, W x H x D, in.	.28x.72x.75	.28x.72x.75	.08x.37x.50	.50x1.25x1.06	.50x1.25x1.06	.14x.62x.70	.75x1.00x.81	.75x1.00x.81
NUMERAL SIZE, W x H, in.	3/32 x 3/16	3/32 x 3/32	.046 dia.	3/16 x 1/32	3/32 x 3/32	.062 dia.	1/32 x 3/4	3/16 x 3/16
LAMP VOLTAGE, volts	1.4	1.4	1.4	5.0	5.0	5.0	10.0	10.0
AVERAGE CURRENT, amps	.14	.027	.027	.30	.06	.06	.20	.04
LAMP LIFE, hours	400	400	400	100,000	100,000	100,000	20,000	20,000
AVERAGE BRIGHTNESS, ft. lamberts	50	50	50	50	50	50	50	50
READABILITY DISTANCE, ft.	15	15	15	25	25	25	35	35
WEIGHT, ounces	.16	.16	.017	.64	.61	.054	.44	.40

*Part number 1890 is without built-in decimal point. DIGICATOR with decimal is part number 1829.



ACTUAL SIZE

BRAND-NEW!
Series 14
ALPHA-NUMERIC
DIGICATOR
WRITE FOR DETAILS

microphysics inc.

233 MAIN STREET, HUNTINGTON, L. I., NEW YORK
TEL. 516-271-0720 TWX 516-421-4562

THIS IS DIG!GATORTM

THE
NEW LINE OF
ELECTRONIC
NUMERIC
READOUTS



(unit shown
actual size)

CONTACT THE MICROPHYSICS REP!

WANT MORE INFO? COMPLETE CATALOG? EYE-OPENING DEMONSTRATION?

The new MICROPHYSICS line of electro-optical incandescent readouts with a host of exclusive design and performance characteristics that make them ideal for a wide range of numerical display applications, including:

Digital Voltmeters, Ohmmeters	Production Control Boards
Frequency Meters, Counters	Process Control Panels
Electronic Digital Clocks	Transportation Schedule Boards
Digital Calculators	Signal Indicators
Computer Readouts	Airborne Instruments
Remote-Repeater Indicators	Marine Instruments
Stock Quotation Boards	Missile Command Panels
Command & Control Presentations	Test & Checkout Systems

microphysics inc.

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HUNTINGTON, N. Y.
(516) AR 1-0720
TWX: 516-421-4562

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